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PROPOSED ACTION MEMORANDUM
FOR THE IHSS 129
TANK CLOSURE PROJECT
ACCELERATED RESPONSE ACTION

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TABLE OF CONTENTS

TABLE OF CONTENTS
continued

Section | **Page**

LIST OF TABLES

LIST OF FIGURES

ACRONYM LIST

ARARs . . . . Applicable or Relevant and Appropriate Requirements
BGS . . . . Below ground surface
CAD/ROD . . . . Corrective Action Decision/Record of Decision (CAD/ROD)
CCR . . . . Colorado Code of Federal Regulations
CERCLA . . . . Comprehensive Environmental Response, Compensation and Liability Act
HEPA . . . . High efficiency particulate air (filter)
IHSS . . . . Individual Hazardous Substance Site
OSHA . . . . Occupational Safety and Health Administration
OU . . . . Operable Unit
PAM . . . . Proposed Action Memorandum
PCE . . . . Tetrachloroethene
RCRA . . . . Resource Conservation and Recovery Act
RFETS . . . . Rocky Flats Environmental Technology Site
SWTF . . . . Sitewide Water Treatment Facility
TCA . . . . Trichloroethane
TCE . . . . Trichlororethene
TCFM . . . . Trichlorofluoromethane
TD . . . . Thermal desorption
VOC . . . . Volatile organic compound

PROPOSED ACTION MEMORANDUM
FOR THE IHSS 129 TANK CLOSURE PROJECT
ACCELERATED RESPONSE ACTION

1.0 PURPOSE

The purpose of this Proposed Action Memorandum (PAM) is to obtain approval of the Department of Energy/Rocky Flats Field Office's (DOE/RFFO) proposed closure of two underground fuel oil tanks (Tanks #3 and #4) located adjacent to Building 443. This PAM includes an overview of the proposed action, closure and performance standards normally associated with a closure plan and/or permit and will act as the vehicle for approval of the storage, treatment and/or disposal of various waste streams removed or generated as part of this action.

— CLARIFY, USE TEXT MIGHT OUT OF UST EXEMPTION

BACKUP VS. — Tanks #1 through #4 are below ground fuel oil storage tanks that were used to store fuel oil for emergency use at the Rocky Flats Environmental Technology Site (RFETS) located in Golden, Colorado. Tank #4 has been identified as Individual Hazardous Substance Site (IHSS) 129. IHSS 129 is located within Operable Unit 10 (OU 10) and is east of Building 443, the Rocky Flats Steam Plant. Documentation exists indicating that prior to 1986, Tank #4 received spent organic solvents, and the tank is suspected of being breached. These solvents are "F- listed" and require remediation under the Colorado Hazardous Waste Regulations. Tank #3, although not included in IHSS 129, is adjacent to Tank #4, and has been incorporated into this PAM because organic solvents have been detected in this tank as well. Tanks #1 and #2 contain only stored fuel oil for consumptive use in the boilers in Building 443 and have not received hazardous wastes. Tanks #1 and #2 are no longer in service and will have their fuel oil contents removed as part of a separate maintenance action.

The main objective of this accelerated response action is to close Tanks #3 and #4 by removing and properly disposing of any hazardous waste, solvent contaminated soil, ~~and~~ the tanks, and associated ancillary equipment. These objectives are consistent with the hazardous waste tank closure requirements of 6 Colorado Code of Federal Regulations (CCR) 1007-3, Section 264.197(a).

REMOVAL VS. CONCENTRATIONS ✓ LEVELS

This response action assumes that ~~no~~ radionuclides are NOT present above background in the vicinity of the tanks. In October, 1994, Radiological Engineering personnel at RFETS deemed the area to be a Non-Radiological Materials Management Area.

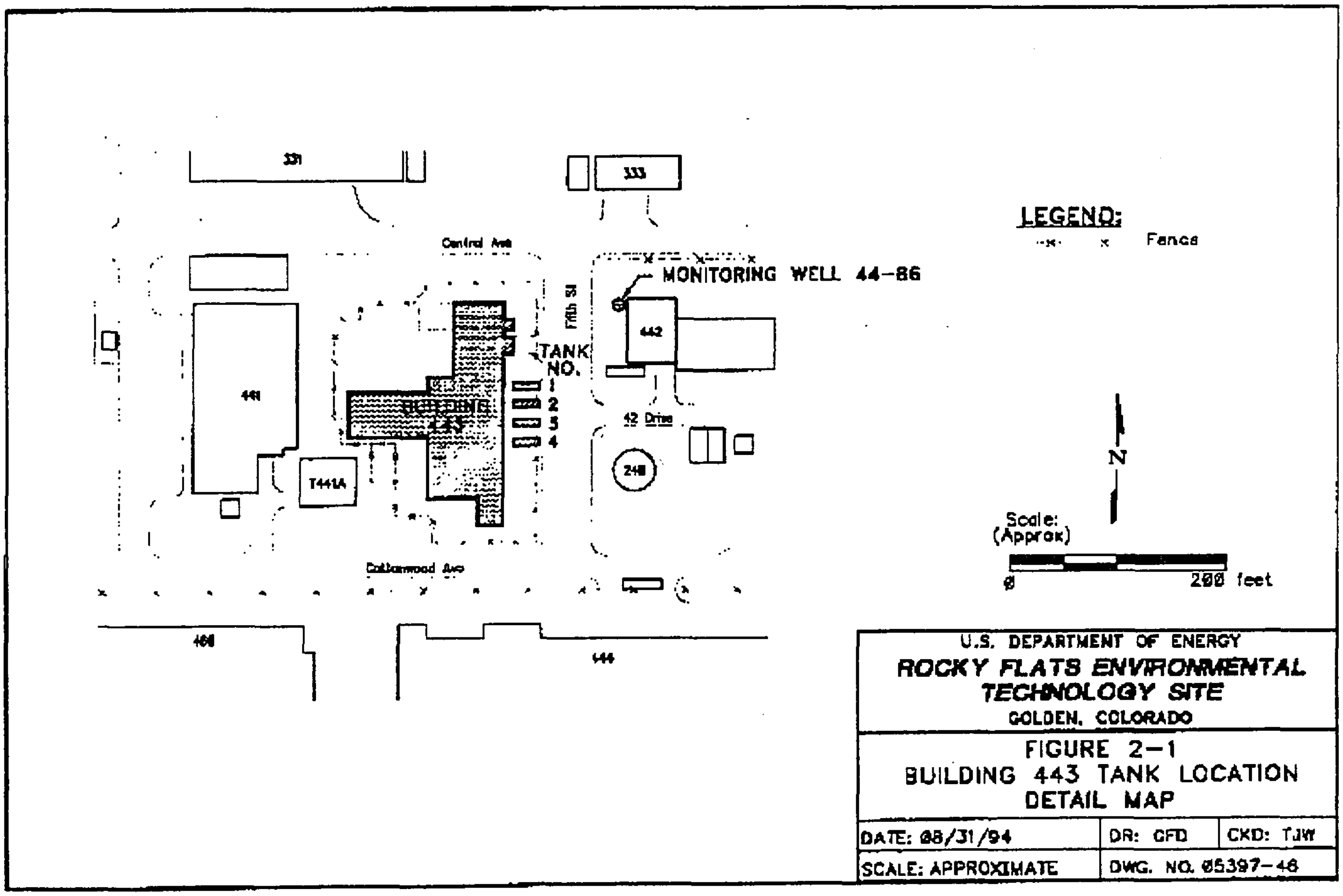
2.0 SITE BACKGROUND

RFETS is a government-owned, contractor-operated facility that is part of the nationwide Department of Energy nuclear weapons complex. Until January, 1992, RFETS was operated as a nuclear weapons research, development, and production complex. RFETS fabricated nuclear weapons components from plutonium, uranium, beryllium, and stainless steel. Support activities included chemical recovery, purification of recyclable transuranic radionuclides, and research and development of metallurgy, machining, nondestructive testing, coatings, remote engineering, chemistry, and physics. RFETS is also currently designated as a Resource Conservation and Recovery Act hazardous waste treatment/storage facility. RFETS is in transition from a defense production facility to a facility that will be used for such future missions as environmental restoration, waste management, and eventual decontamination and decommissioning.

2.1 Site Description

OU 10, titled, "Other Building Closures," is one of six OUs included in the Industrial Area (IA) of Rocky Flats. IHSS 129, Building 443, Tank #4, is one of 16 IHSSs in OU 10 and one of four fuel oil tanks used to supply No. 6 fuel oil to the Building 443 Steam Plant boilers. The Building 443 Steam Plant provides heat via natural gas to other buildings at RFETS. These tanks were used as a backup fuel system in the event of a natural gas loss. The tanks are located approximately 16 feet east of the building. The tanks are oriented longitudinally in an east-west direction (Figure 2-1).

FIGURE 2-1 Building 443 Tank Location Detail Map



Tanks #3 and #4 were both installed in 1967. Tank # 4 was taken out of service in 1986 due to the discovery of nearby soil contamination resulting from a breach in Tank #4. Tank #3 was taken out of service in 1991 when its heating coil malfunctioned. The tanks are constructed of carbon steel and are thought to be 11 feet in diameter by 27 feet long with a storage capacity of approximately 19,000 gallons each. The top of Tanks #3 and #4 are approximately four feet below ground surface (BGS) (DOE, 1992a).

Five pipelines, parts of which are believed to be partially wrapped in asbestos, are connected to the tanks. Four steel supply and return lines connect each of the four tanks to Building 443. These four lines consist of a steam line to supply the heating coils located inside each tank, a return condensation line from the heaters, a line to pump fuel oil to Building 443, and a return line for oil being circulated from the Building 443 boilers. The fifth line is an above ground supply line which connects two large storage tanks (Tanks #221 and #224) south of Building 551 to the four fuel oil tanks.

2.2 Physical Environment and Ecology

The land surface in the vicinity of IHSS 129 is relatively flat with a gentle slope to the northeast. Groundwater occurs in unconfined conditions in alluvial deposits varying up to 50 feet thick under the industrial area, including IHSS 129. Based on data collected from Well 44-86 (Figure 2-1), the depth-to-water varies seasonally from approximately 3.5 to 10 feet BGS and at times may be up to 20 feet BGS. In August, 1994, the depth-to-water in Well 44-86 was measured at 7.6 feet BGS.

The alluvial deposit, the Rocky Flats Alluvium, is composed of poorly sorted, coarse, bouldery gravel in a sand matrix with lenses of clay, silt, and sand. Bedrock, the Arapahoe Formation, underlies the alluvium and is composed of sandstones and claystones.

The physical environment in the vicinity of IHSS 129 consists of gravel with sporadic patches of weeds growing through the gravel. There are no floodplains or wetlands at or near IHSS 129. Additionally, no endangered wildlife species will be affected by this accelerated response action.

2.3 Existing Data/Process Information

The following description provides a summary of the materials historically stored in Tanks #3 and #4, the reported releases from the tanks, and the investigation of the contaminated media. More detailed information is provided in the OU 10 Work Plan (DOE, 1992a).

Tank #3 stored No. 6 fuel oil between 1967 and 1991 when it was taken out of service because its heating coil malfunctioned. There is no documentation that Tank #3 was used to store any substance other than No. 6 fuel oil. However, OU 10 personnel have suggested that historical pumping between Tanks #4 and #3 may have occurred (Rockwell, 1988 and DOE, 1992a), and samples collected from Tank #3 indicate the presence of low concentrations of volatile organic compounds (VOCs), probably solvents.

Tank #4 primarily stored No. 6 fuel oil between 1967 and 1984, but also held diesel oil and a mixture of water and compressor oil. During the 1970s, the tank was used to store approximately 20,000 gallons of No. 2 diesel oil. From 1984 to 1986, Tank #4 was used to store a mixture of water and compressor oil, in a ratio of approximately 9:1. The mixture was placed in the tank at a rate of approximately 30 gallons per day. Solvents used for cleaning equipment and cleaning up fuel oil spills at Building 443 were also added to the tank at the rate of approximately 55 gallons of solvents per year between 1967 and 1986. This represents a potential of approximately 1045 gallons of solvents added to Tank #4 over its lifetime.

The approximate volume of Tank #3 and #4 contents were calculated from measurements taken on September 28, 1994. Tank #3 contained 21 gallons of oil-phase liquids, 10,707 gallons of water-phase liquids, and 7,300 gallons of sludge. Tank #4 held 9,040 gallons of water-phase liquid and 311 gallons of oil/sludge. The water-phase liquids in Tanks #3 and #4 are suspected to have entered through a breach in each tank, although the exact location of each hole is unknown (DOE, 1992a).

2.4 Historical Discovery of Contaminated Media Resulting from Breaches in the Tank

On March 6, 1986, a four and one half foot-deep fence post hole dug near the eastern edge of Tank #4 partially filled with a material thought to be compressor oil. Three days later, No. 6 fuel oil was discovered in another fence post hole nearby (DOE, 1992b). As a result of these observations, the use of Tank #4 was discontinued. Approximately 12,900 gallons of material were subsequently removed from the tank and sent offsite for disposal.

2.4.1 Previous Investigation of Contaminated Media

Following the observation of material in the fence post hole east of Tank #4, a trench approximately three feet wide by four feet deep by 100 feet long was excavated east of the four fuel oil tanks. Dark fuel oil stains were observed in the southernmost 30 feet of the trench immediately east of Tank #4. No free product was observed in the trench. The trench was subsequently backfilled.

Samples of the material stored in Tank #4 and the material that appeared in the fence post hole east of Tank #4 were collected and analyzed for volatile organic compounds and total petroleum hydrocarbons. Samples from Tank #4 were collected from the oil-phase and the water-phase liquid in the tank. Results of the analysis by an independent offsite laboratory are summarized in Table 2-1 and indicate the presence of VOCs.

TABLE 2-1
Summary of Samples of Contents of Tank #4 and Liquid in the Fence Post Hole Collected on March 7, 1986

Constituent	Oil-Phase Liquid from Tank #4 (mg/L)	Water-Phase Liquid from Tank #4 (mg/L)	Material Observed in Fence Post Hole (mg/L)
Methylene Chloride	140	25	14
1,1,1,-Trichloroethane (TCA)	17,000	40	32
Trichlorofluoromethane (TCFM)	<5	17	29

Source: Rockwell (1988)

It is not known how many samples were collected for offsite laboratory analysis. Two samples from each of the oil-phase and water-phase contents of Tank #4 were also analyzed at an onsite laboratory. Onsite laboratory analysis indicated the presence of 1,1,1-trichloroethane (TCA) in the oil-phase liquid at levels of 58 and 65 milligrams per liter (mg/L), and in the water-phase liquid at 10.7 and 27.5 mg/L. Onsite laboratory analysis also detected trichloroethene (TCE) in the water-phase liquid at trace level (less than 10 micrograms per liter [µg/L] and at 25 µg/L) (Rockwell, 1988).

In 1994, additional samples were collected from liquids in Tanks #3, and #4. The analysis was performed at onsite laboratories. Results of volatile organic analysis are presented in Table 2-2. Samples collected for metals analysis indicated insignificant (trace) levels of various metals such as iron, manganese, calcium and sodium. None of the data listed in Table 2-2 has been validated.

TABLE 2-2
Summary of Highest Concentrations from Samples of Contents of Tanks #3 and #4 Collected in the Fall of 1994

Constituent	Liquid From Tank #3 (mg/L) (Samples #07001, 07002)	Liquid From Tank #4 (mg/L) (Samples #07201, 07202)
Acetone	1.6	0.091 J
1,1-Dichloroethene	ND	0.210 J
1,1-Dichloroethane	ND	0.056 J
1,1,1- Trichloroethane (TCA)	ND	0.65
4-Methyl-2-Pentanone	0.19 J	ND
Tetrachloroethene	ND	1.9
Xylene (total)	0.027 J	ND
Trichlorofluoromethane (TCFM)	ND	0.66

In 1988, four soil borings were drilled near Tank #4, including one boring between Tanks #3 and #4. The actual depth of these borings and sampling points was not identified (Rockwell, 1988). The locations of the soil borings are presented in Figure 2-2 as FOT1 through FOT4. Results of the soil sample analyses are presented on Table 2-3 and indicate the presence of elevated VOCs and metals above detection limits. The data in Table 2-3 has not been validated.

FIGURE 2-2 Location of 1988 Soil Borings

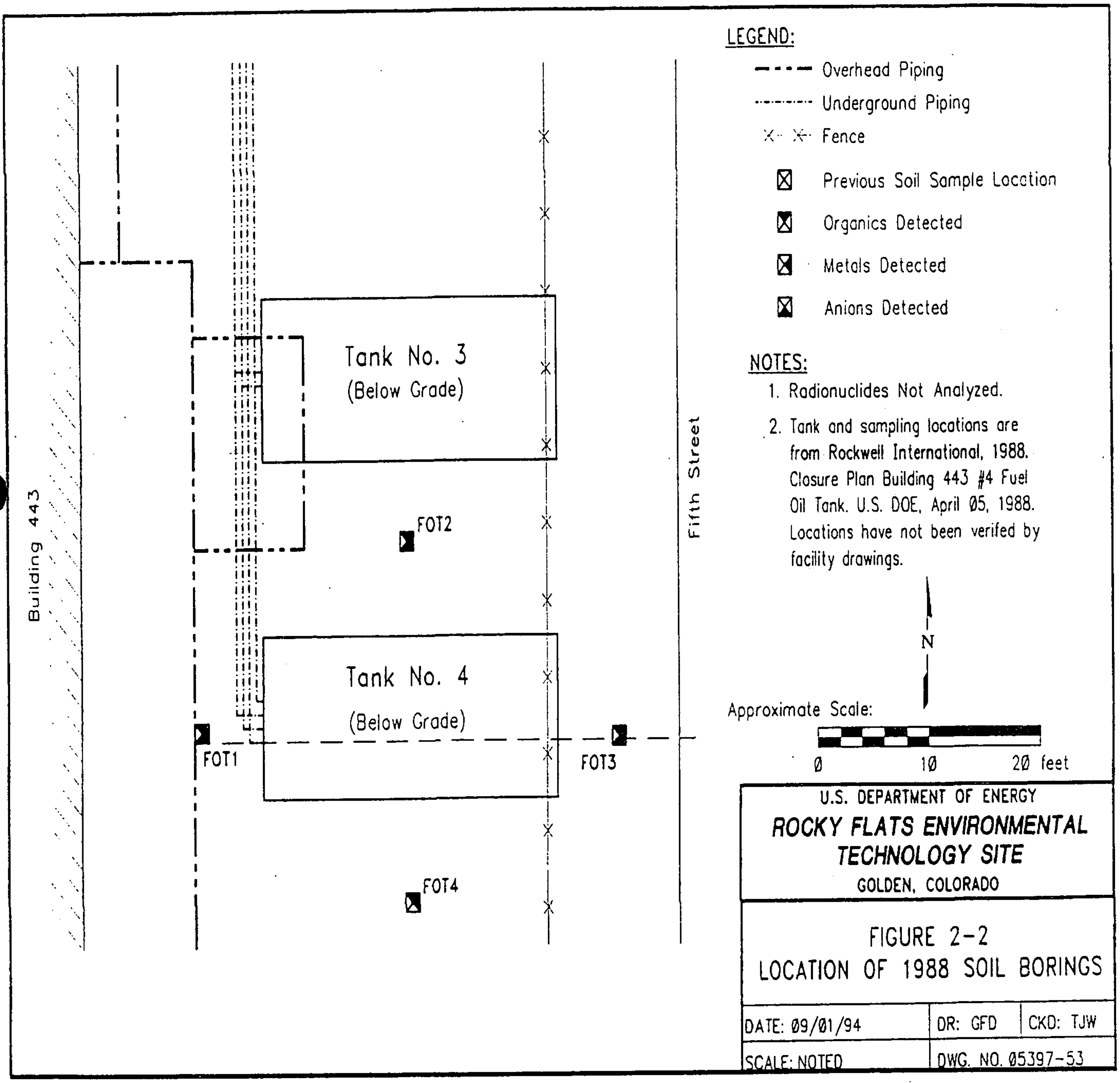


TABLE 2-3
Summary of IHSS 129 Soil Samples Collected in 1988

Constituent	Detected Concentration Range at Soil Borehole Locations (mg/kg)			
	FOT1[1]	FOT2	FOT3	FOT4
VOCs and Semi-VOCs				
Methylene chloride	0.004J, 0.014B	0.065J, 0.43	1.1	0.057J, 0.06J
Acetone	0.018			0.37J
1,1,1-Trichloroethane		0.34		
Benzene	0.003J, 0.005J		0.57	0.078J, 0.180J
Toluene	0.01, 0.011	0.071J, 0.180J	1.7	0.17J, 0.32
Ethylbenzene	0.033, 0.040	0.14J, 0.20J	1.6	0.36, 0.490
Total Xylenes	0.035, 0.042	0.33, 1.50	4.7	2.00, 3.00
2-Methylnaphthalene	7.80J			
Pyrene	7.10J			
Benzo(a)anthracene	3.60J			
Chrysene	8.10J			
Metals and Other Inorganics				
Aluminum	8100	3900	9300	3500
Arsenic			2.4	
Beryllium	1.3			
Calcium	4900	3200	1700	
Cadmium	3.6	1.5	3.4	
Chromium	8.4	6.8		4.3
Copper	12	6.4	9.6	
Iron	12000	6200	9100	3700
Lead	14	4.8	38	570
Mercury	0.47	0.45	0.28	0.18
Magnesium	1800		1300	
Manganese	110	67	88	42
Nickel	19		8.7	
Potassium	1100			
Vanadium	23	16	22	
Zinc	30	13	20	16

Notes:
1 - Locations provided on Figure 2-2
J - Estimated quantity
B - Present in blanks

Source: DOE, 1992. Final Phase I RFI/RI Work Plan, Rocky Flats Plant, DOE, 1992. Final Phase I RFI/RI Work Plan, Other Outside Closures (Operable Unit 10). Volume II – Appendix C. May 1992.

11

2.4.2 Historical Releases to the Environment

There are documented increases and deceases in the level of material in Tank #4 due to groundwater entering and exiting through a suspected breach in the tank. The breach, along with spills associated with overfilling the tanks throughout their history, is a source of contamination to the subsurface.

In November, 1977, a leak in an underground transfer pipe near Tank #4 was discovered when approximately 600 gallons of No. 6 fuel oil was recovered from the sewage treatment plant. The total amount of oil released is unknown. The oil-contaminated soil encountered during excavation to repair the pipe was disposed in the RFETS sanitary landfill (Rockwell, 1988).

3.0 PROJECT APPROACH

This PAM provides specific information on tank closure and contaminated soils excavation, waste storage, processing, and equipment decontamination.

Tanks #3 and #4 will be closed under the Colorado hazardous waste tank closure requirements, 6 CCR 1007-3, 264.197(a). These tanks will be removed from the ground along with contaminated soils surrounding the tanks. The contaminated soils will then be processed onsite or shipped to an approved offsite Treatment Storage and Disposal facility depending on contaminant concentration levels and cost considerations.

After soils are excavated, confirmation sampling will be conducted across the excavation bottom, including the perimeter of the excavation, to document conditions remaining after the source removal. The goal of the contaminated soil removal is based on cleanup objectives from the Rocky Flats Accelerated Site Action Project (ASAP) document. This draft document assumes cleanup to a commercial/industrial scenario. The current Rocky Flats construction worker (Programmatic Preliminary Risk-Based Remediation Goals (PPRG) (DOE, 1995) is assumed to be consistent with the commercial/industrial scenario being developed in the ASAP document. If the excavation performance goals are met (1×10^{-6} risk using a construction worker risk scenario), this source removal will be considered a final closure for IHSS 129. If further remediation is determined to be necessary, based on evaluation of sampling results, this remediation will be addressed in the Corrective Action Decision/Record of Decision (CAD/ROD) for Operable Unit 10.

Solvent-contaminated soils are expected to be processed in a portable thermal desorption unit regulated under miscellaneous unit status (6 CCR 1007-3, Part 264, Subpart X). Other appropriate requirements, including thermal treatment standards (6 CCR 1007-3, 265, Subpart P) have been used as guidelines to develop standards for operation of the unit. The container storage area discussed in this document is considered a Temporary Unit under 6 CCR 1007-3, 264.553 and will be managed in accordance with the standards for the use and management of containers found in 6 CCR 1007-3, 265, Subpart I. This classification will allow for the use of efficient storage requirements during the remediation. As identified under this regulation, the Temporary Unit classification applies due to the short time frame for operation of the storage unit, the portable

12

nature of the storage containers (roll-offs), and the small volume of soil to be stored. The solvent contaminant soils and waste waters managed during this response action are environmental media containing Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances and Resource Conservation and Recovery Act (RCRA) listed hazardous waste.

3.1 Proposed Action Objectives

The objectives of the tank closure source removal are:

- removal of the tanks and their residues;
- removal of the contaminated soils; and
- properly recycle, treat, and/or dispose contaminated soils, tank residues, tank materials and associated ancillary equipment (e.g., piping).

The following activities will support the objectives of this project:

- removal, packaging and disposal (at an approved facility) of asbestos containing piping and ancillary equipment removed in support of this job;
- excavating the soil and segregating clean, uncontaminated soil from soil contaminated by the contents of the tanks due to probable breaches in the tanks.
- stockpiling clean, uncontaminated soil in the general work area for return to the excavation;
- temporary storage of solvent contaminated soil removed during the excavation at the location established for processing the contaminated soil;
- removal, sizing, decontamination, and packaging of tanks, piping, ancillary equipment (vaults, controls, etc.), and metal straps for recycling or disposal;
- containerizing and processing the water-phase contents of the tanks, the water removed to support the excavation, and decontamination water with an oil/water separator or hydrocyclone, followed by treatment at the Sitewide Water Treatment Facility (SWTF) located at Building 891;
- performing confirmation sampling at the bottom of the excavation including the perimeter margins to document conditions remaining after the source removal;
- treating contaminated soils onsite or shipping to an approved offsite facility, as appropriate;
- sampling various waste streams as a precursor to meeting appropriate facility specific waste acceptance criteria;

- abandoning the shoring supports surrounding the excavation *in-situ* (cutting them off approximately six inches BGS);
- leaving the concrete saddles (used to ballast the tanks) *in-situ*; and
- reclaiming the site.

3.2 Excavation and Removal of Contaminated Soils and Tanks

Because of the large number of in-service structures and piping surrounding the tanks, the source removal will be limited to the area defined by the perimeter of the shoring used to keep the excavation open and the ancillary piping between the tanks and the Steam Plant wall. The dimensions of the shoring are expected to be approximately 42 feet long by 37 feet wide by 17 feet deep and will be dependent on the completion of a piping survey. These dimensions will allow for an over-excavation of approximately five feet around the perimeter of the tanks and approximately two to four feet below the tank bottoms. If contaminated soil is observed below the 17-foot objective, the field supervisor, after consultation with safety personnel, will decide whether additional contaminated soil can be removed without endangering personnel or structures. The contaminated soil will then be removed as appropriate.

Final closure of Tanks #3 and #4 will be achieved when the tanks, their contents and the surrounding contaminated soils are removed and properly processed and/or disposed of. Because these tanks received regulated hazardous wastes (solvents) in the past, they are being closed under the hazardous waste tank closure requirements contained in CCR 1007-3, Section 264.197. These closure standards require that contaminated soil be removed. The performance objective for Tanks #3 and #4 soils will be the removal of solvent contaminated soils to the levels specified in the PPRGs for RFETS using a construction worker scenario. These levels are consistent with the objectives of the Rocky Flats ASAP document. The draft ASAP document assumes cleanup to a commercial/industrial scenario.

Prior to final confirmation sampling at the excavation bottom, attainment of the excavation performance objectives will be verified by the use of a field gas chromatograph or quick turnaround laboratory service. These details are addressed in the sampling and analysis plan.

3.3 Waste Storage

Solvent-contaminated environmental media removed from the site will be placed into portable containers such as roll-offs for soil and large waste water containers for liquids prior to processing and/or disposition. This material will be managed according to the substantive requirements of the use and management standards applicable to containers listed in of 6 CCR 1007-3 Section 264, Subpart I. These standards generally regulate the condition and compatibility of containers with hazardous waste and the management and inspection of the containers. Because of the limited space available, the soils contaminated with organic solvents will be moved from the excavation area near Building 443 to the east side of the plant for storage pending final treatment. Container storage areas will have signs posted and labels placed in conspicuous locations, indicating appropriate dangers.

3.4 Waste Treatment

Three onsite processes will be used to treat various waste streams. In general, solvent-contaminated soils are expected to be treated with a vendor-supplied mobile thermal desorption unit, solvent contaminated tank components will be treated with high pressure steam cleaners, and various solvent contaminated waste waters will be treated at the onsite SWTF located at Building 891. Concentrated contaminants such as recovered organic condensate from the thermal desorption unit and solvent contaminated sludges and oils from Tanks #3 and #4 will be sent offsite for treatment at an appropriately permitted facility. The onsite treatment and the subsequent waste disposition is summarized in the following sections.

3.4.1 Solvent Contaminated Soil Treatment/Disposition

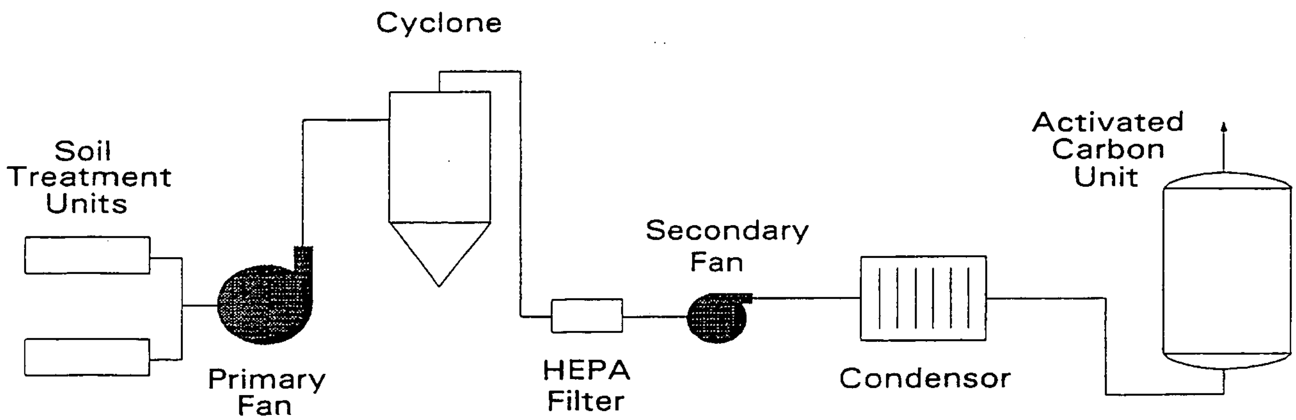
A low-temperature thermal desorption (TD) system may be used to remove VOCs in a non-destructive manner from soils excavated around the tanks. The soils will be processed on a batch-by-batch basis by passing air through the contaminated soil to volatilize or "strip" the VOCs from the soil into the vapor phase. In addition to the air sweep, heat and vacuum will be applied to the soils to enhance the VOC-stripping process. The vapor-phase contaminants will then be recovered by condensation and activated carbon adsorption.

Additional description of the thermal desorption system components, operation, and secondary waste streams that will be generated is presented below. The operating data (i.e., batch size, temperature, etc.) presented in the following section are typical of batch-operated, low-temperature thermal desorber systems but may not describe the exact unit contracted for this task.

3.4.1.1 System Description and Operation

Figure 3.1 presents a generalized process flowsheet of the TD process. VOC-contaminated soil is loaded into the soil treatment units in batches. Solvent contaminated soil may be transferred from roll-offs to the soil treatment units with a backhoe, Bobcat, or other type of heavy equipment. The soil treatment units are constructed of heavy structural steel and are capable of supporting the weight of a backhoe or other large equipment. The structural steel construction makes the units suitable for treating soils containing hazardous waste. Prior to unloading, the roll-offs will be located as close to the desorber as possible to minimize the distance the soil will have to be moved by the backhoe or Bobcat. If soils containing free liquids are placed into containers during excavation activities, additional site preparation will take place to prevent any spill of free liquids contaminating clean areas. Soil clumps loaded into the treatment units that are greater than eight inches in diameter will be broken into smaller pieces. Low-temperature batch desorption is capable of effectively removing VOCs from soil clumps up to eight inches in diameter.

Figure 3.1
Thermal Desorption Process Flowsheet



NOTE: This figure represents a typical flow diagram for a thermal desorber. Actual unit may vary from the one shown.

Processing capability of a TD system is dependent on many factors such as soil type, moisture content, and contaminants. Typically, TD systems process between two and 20 tons per hour (1.25-12.5 cubic yards/hour). Once loaded, the soil treatment units are closed and an air sweep is induced across the soil beds by a fan unit. The air sweep creates a slight vacuum (i.e., 700-750 mm Hg) in the soil treatment units which serves to enhance the VOC stripping rate. Stripping is also enhanced by indirect heating of the soil. Heat is generated by burning propane (or natural gas) and passing the hot combustion gases through metal tubes located in the treatment units. Heat from the combustion gases is transferred through the tube walls to the air sweep and soil. All three heat transfer mechanisms are present: conduction, convection, and radiation. Soil operating temperatures typically range from 150 to 600 degrees Fahrenheit.

The VOC contaminants contained in the air sweep/offgas exiting the soil treatment units are treated prior to discharge. A high efficiency particulate air (HEPA) filter may be used to remove any soil particulates that are entrained in the offgas. The offgas is then cooled by a condenser to recover the majority of water and VOC contaminants as liquids. The condenser is the first unit that concentrates the desorbed contaminants. As noted above, both the VOCs and water are condensed simultaneously. Following the condensing process, the offgas is polished with vapor-phase activated carbon to recover residual VOCs prior to discharge. No chemicals are added as part of the desorption process; thus, no chemical incompatibilities are anticipated.

The TD unit will be operated in accordance with the thermal treatment standards (Table 3-1) found in 6 CCR 1007-3, Subpart P of Section 265. Additionally, the air emission standards for process vents and equipment leaks defined in 6 CCR 1007-3, Subparts AA and BB of Section 264, will be followed as appropriate. The vendor supplying and operating the thermal desorption unit may demonstrate to the Colorado Department of Public Health and Environment that because of the limited nature and risk associated with the treatment phase, that alternative operating standards are appropriate. Letters documenting the acceptance of these alternative operating standards would then be considered part of this PAM.

3.4.1.2 Waste Acceptance Criteria for Thermal Desorption Unit

Criteria are established below to ensure the safety of workers and the protection of equipment during the processing of solvent contaminated soil. Debris, such as wood, scrap metal (e.g., cut up tank component) and glass, may be encountered during source removal activities and will not be restricted from processing as long as the debris can be sized to fit into the desorption unit. Clumps of contaminated soils will be broken up if their diameter exceeds eight inches to ensure that all internal volumes are treated. In addition to the general requirements stated above, the following is a list of specific items that will be prohibited from treatment with this thermal desorption unit:

- Items that are explosive as defined by the Department of Transportation (49 CFR 173.5, Subpart C);
- Items that are corrosive (6 CCR 1007-3, 261.22);
- Items that are reactive (6 CCR 1007-3, 261.23); and
- Unexpected items encountered during field activities in which unresolved questions exist regarding personnel safety or the protection of equipment.

3.4.1.3 Performance Objectives for Thermal Desorption Processing

The following performance standards are being established for removal of solvents from the IHSS 129 soils. These concentration levels were taken from the Soil Screening Guidance, Office of Solid Waste and Emergency Response Directive 9355.4-14FS, December, 1994 (draft). Soils meeting these risk-based performance standards are delisted environmental media and may be used as fill material at the RFETS landfill, disposed at an approved offsite landfill, or returned to the excavation, as appropriate.

17

Table 3-1 Performance Standards for the Processing of Soils Containing Solvents from IHSS 129

Constituent	Performance Standard Concentration (Mg/Kg)
Acetone	160*
1,1-Dichloroethane	0.014**
1,1-Dichloroethene	1.27**
4-Methyl-2-Pentanone	33*
Methylene Chloride	7
Tetrachloroethene (PCE)	11
1,1,1- Trichloroethane (TCA)	880
Trichloroethene (TCE)	3
Trichlorofluoromethane (TCFM)	30*

If results from laboratory analysis of after-process samples come back as non-detections, at sample quantitation limits (SQLs) exceeding these performance standards, then the processing goals are considered achieved. Debris processed through the thermal desorption unit will be evaluated using after-process soil samples to the same performance standards established for the solvent-contaminated soils. Debris meeting these performance standards will no longer be considered hazardous and can be landfill-disposed.

3.4.1.4 Thermal Desorption Unit Secondary Waste Stream Disposition

The thermal desorption process described will generate several secondary waste streams. These waste streams include condenser liquids and spent activated carbon. The condenser liquids will consist of free-phase organic liquids and water (i.e., two phases). Depending on the volume of recovered water, the water may be separated from the free-phase organic liquid and sent to the SWTF located at Building 891 for subsequent treatment. The other waste streams, including the free-phase organic liquids, will be drummed, characterized, and shipped offsite for proper disposal as hazardous waste, as appropriate. Waste water from decontamination activities will also be generated at the conclusion of the soil processing task. These liquids will be managed according to procedures described in Section 3.4.3 of this PAM.

3.4.2 Solvent Contaminated Tank Component Treatment/Disposition

During removal, Tanks #3 and #4 are expected to be cut up and sized along with removing the bulk of the sludge/oil residues. Since the tanks contained listed hazardous wastes defined under 6 CCR 1007-3, Section 261, the sized tanks and contaminated ancillary components from Tanks #3 and #4 are considered hazardous debris. This hazardous debris will be decontaminated according to the treatment standards for hazardous debris. It is expected that one of the physical or chemical extraction technologies specified in this standard will be used to perform the treatment. The technology anticipated to be used is physical extraction using high pressure steam and water sprays. However, other approaches are left open because of the "tar-like" nature of the residues expected to contaminate the debris. Visual inspection will be conducted to complete the debris treatment process.

The use of high pressure steam cleaning and water spray technology and the corresponding performance standard is given in 6 CCR 1007-3, 268.45(A)(1)(e). After the tanks components are sized and the sludges removed, the tank components would be extensively washed using high pressure steam and water sprays. The performance standard for this technology is to remove contaminants "to a clean debris surface." This definition is further defined in the regulation. The waste water from this treatment will be processed through an oil/water separator or hydrocyclone with the waste water portion being further treated at the SWTF. The oily fraction would be sent offsite for proper treatment and disposal along with the sludge residues that were previously removed. The sized metal tank components are then expected to be sent to an offsite metals processor for recycling.

3.4.3 Solvent Contaminated Waste Water Treatment/Disposition

Solvent contaminated waste water generated during this activity will include the following:

- water-phase contents of Tanks #3 and #4;
- water removed to support the excavation; and
- decontamination water.

This water is first expected to be processed through an oil-water separator or hydrocyclone to remove the oily fraction. Following separation of the oil and water phase, the water will be treated at the SWTF located at Building 891 and released to the South Interceptor Ditch (SID), consistent with the general disposition of all waters treated at Building 891. The solvent-contaminated oil-phase material will be combined with sludges and oils removed from Tanks #3 and #4 for offsite treatment and disposal.

3.5 Equipment Closure and Decontamination

This section addresses appropriate requirements for the closure of the roll-off containers and thermal desorption treatment unit.

After the completion of contaminated soil processing, the following materials will be removed from the thermal desorption unit:

- soil;
- organic condensate;
- granulated activated carbon; and
- used HEPA filters (as appropriate).

Recovered organic contaminants (organic condensate), granulated activated carbon and the used HEPA filters will all be characterized for proper disposal. Soil removed from the thermal desorption unit will be temporarily placed into previously decontaminated roll-off containers, waiting for the results of confirmation samples to evaluate the attainment of the performance standards listed in Section 3.4.1.2. Following evaluation and attainment of performance standards, the processed soils are then expected to be transported to the onsite landfill for use as cover material. The thermal desorption unit and roll-off containers will then be decontaminated according to procedure number 4-SO-ENV-OPS-FO.04, Decontamination of Equipment at Decontamination Facilities. The performance standard applied to this decontamination will be decontamination to a clean surface as specified for metal surfaces in 6 CCR 1007-3, 268.45(A)(1)(e).

Decontamination methods and solutions used to achieve the performance standard are described in the referenced procedure. Volumes of waste water generated during decontamination will depend on levels of contamination, the configuration of the vendors thermal desorption unit, etc. However, all efforts will be made to limit the amount of decontamination water generated while still meeting the "clean surface" performance standard.

It is expected that this large-scale decontamination will take place at the site's centralized decontamination facility located in the Contractor's Yard. Both the roll-off containers and the thermal desorption unit are expected to be returned to the vendors for subsequent use after decontamination.

4.0 WORKER HEALTH AND SAFETY

Due to the contaminants present in Tanks #3 and #4 and the activities required to remove the tanks, this project falls under the scope of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operation and Emergency Response and Construction standards. Under these standards, a site-specific Health And Safety Plan will be developed which will meet the requirements of OSHA 29 CFR 1910.120 and addresses the safety and health hazards of each phase of site operations and specifies the requirements and procedures for worker protection. Additionally, a hazard analysis will be developed which specifies hazards to which workers may be exposed during each phase of the project and the appropriate control measures to be used. These documents will be integrated wherever possible.

The project involves potential worker exposure to physical and chemical hazards. The physical hazards include those associated with excavation activities, use of heavy equipment, work on uneven surface, and the hazards associated with the cut-up and sizing of the tanks and associated piping. Shoring will be in place to prevent collapses during the limited periods in which workers must go into the excavation. If conditions at the site change from what was anticipated during the planning process, an activity analysis will be prepared for the current circumstances and work will proceed according to the appropriate control measures. Worker exposure to noise and heat or cold stress will be evaluated. Appropriate personal protective equipment will be worn throughout the project.

Airborne concentration of VOCs are expected to be below respective worker exposure limits. However, due to the number of VOCs, the combined concentration will also be evaluated against the exposure limits for chemical mixtures. Routine VOC monitoring will be conducted for any employees who must work near contaminated soil or sludges from the tanks and the appropriate personal protective equipment will be worn.

5.0 AIR EMISSIONS

As a result of VOCs that will be processed during this task, calculations will be performed to support the preparation, as required, of an Air Pollution Emissions Notice (APENS) for review by the Colorado Air Quality Control Commission.

6.0 ENVIRONMENTAL IMPACTS

The National Environmental Policy Act requires that actions at RFETS be evaluated for potential impacts to the environment. Impacts to the natural environment resulting from early action will be minimal and are not expected to result in any adverse impacts to wetlands, floodplains, threatened or endangered species or their habitats and historic or cultural resources. There will be minor releases of air pollutants from heavy equipment during excavation and a very minor increase in particulates (dust) associated with the operation of loading and unloading and transferring containers. Any airborne particulates and contaminants resulting from excavation or treatment activities will be controlled with best management practices including water sprays, covering, and pollution prevention controls on processing equipment. Once the removal of the tanks and contaminant source is complete, the site will be returned to natural grade.

7.0 COMPLIANCE WITH ARARs

In accordance with the Interagency Agreement (IAG), an objective of accelerated actions at RFETS is the identification and compliance, to the extent practicable, with Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) that are associated with the proposed action. ARARs relating to the action are identified in this section as summarized in Table 7-1.

There are no chemical-specific ARARs or location-specific ARARs for this proposed action. The Colorado Air Pollution Prevention and Control Act standards for emissions (5 CCR 1001-3, 5 CCR 1001-9) have been identified as action-specific ARARs. Based on characterization data available from the tanks, the anticipated air emissions will be calculated to determine what type of control measures will be needed to ensure compliance with the standards. This analysis, when completed, will be provided to the Colorado Department of Public Health and the Environment prior to the start of operations.

TABLE 7-1 ARARs for the IHSS 129 Tank Closure Project

Action	Requirement	Prerequisite	Citation	ARAR
Air Quality	Compliance with air emissions	Prevention of exceeding emissions for particulates and VOCs	5 CCR 1001-3 5 CCR 1001-9	Applicable
Air Quality	Compliance with NAAQS	Maintain quality of ambient air for particulate matter	5 CCR 1001-14	Applicable
Corrective Action for Tank Systems	Closure and post-closure care	Removal of all hazardous waste residues, contaminated structures, and soils at closure	6 CCR 1007-3, 264.197(a)	Applicable
Corrective Action for Hazardous Waste	Temporary unit container storage requirements	Operate temporary container storage area	6 CCR 1007-3, 264.553	Applicable
Hazardous Waste	Compliance with container management	Manage container condition, compatibility of waste, inspections, containment, and closure	6 CCR 1007-3, 264 Subpart I	Applicable
Hazardous Waste Treatment	Treatment to Universal Treatment Standards for chlorinated solvents	Perform process cleanup to achieve risk-based standards	6 CCR 1007-3, 268.48	Applicable
Hazardous Waste Treatment	Treatment to soil screening levels for inhalation pathway for chlorinated solvents	Perform process cleanup to achieve risk-based standards	Soil Screening Guidance, EPA 9355.4-14FS December, 1994 (draft)	To Be Considered
Hazardous Waste Treatment	Thermal treatment operating standards	Operate thermal treatment unit	6 CCR 1007-3, 265 Subpart P	Relevant and Appropriate
Process Air Emissions	Compliance with air emissions standards for process vents and equipment leaks	Operate treatment systems that contact hazardous wastes with organic concentrations of at least 10 ppm by weight	6 CCR 1007-3, 264 Subpart AA and Subpart BB	Applicable
Hazardous Waste Operations	Hazardous Waste Operating Standards	Operate Hazardous Waste Unit	6 CCR 1007-3 264 Subpart X	Applicable

8.0 IMPLEMENTATION SCHEDULE

This source removal is scheduled to commence in the spring of fiscal year 1996. Present funding constraints may require the project to be divided into two phases. Phase I may consist of source removal (tank contents), removal of ancillary piping and surface structures, and engineering design and bracing of impacted utilities. Phase II is expected to begin in late fiscal year 1996 and may include tank and contaminated soil removal followed by on-site processing of the contaminated soil. Phase II is not expected to be completed until mid-fiscal year 1997. These time frames are projected from work packages; funding, scope or priority changes may affect these dates.

9.0 REFERENCES

DOE, 1992a. Final Phase I RFI/RI Work Plan, Rocky Flats Plant Other Outside Closures (Operable Unit No. 10). Volume I - Text, and Volume II – Appendices. Golden, Colorado. May 1992.

DOE, 1992b. Final Historical Release Report for the Rocky Flats Plant. Volume I – Text and Volume II – Appendices. Golden, Colorado. June 1992.

DOE, 1995. Programmatic Risk-Based Preliminary Remediation Goals. U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado. Final Rev. 2, February, 1995, and August, 1995 update.

Rockwell, 1988. Closure Plan Building 443 No. 4 Fuel Oil Tank. U.S. Department of Energy Rocky Flats Plant Golden, Colorado. April 5, 1988.